## REMARKS

New claims 3-6 have been added to ensure that the Applicant sets forth with particularity what the Applicant regards as his invention with sufficient scope and breadth.

Also, various typographical errors in the specification have been corrected.

Finally, the Applicants have enclosed a red-inked marked copy of original FIG. 82 for the Examiner's approval; the proposed changes secure correspondence between the specification, the figures, and the claims.

Respectfully submitted,

ORIG

Date: 5-13-02

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Enclosures:
Red-ink marked original FIG. 82

## VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Specification:

Page 176, line 9 has been amended as follows: --from the tag, by a simple dedicated 1×1 switching circuitry which is appended to every--.

Page 178, line 13 has been amended as follows: --10 ('0-bound') $\prec$ 00 ('idle'~~0~~) $\prec$ 11 ('1-bound').--.

Page 180, line 18 has been amended as follows: --of a bit-permuting network. The ~~guide of~~ routing tag for the particular $2^n \times 2^n$ networks studied in the prior--.

Page 181, line 1 has been amended as follows: --art is the destination address $d_1d_2 \ldots d_n$ of a packet plus possibly an activity bit up front. By--.

Page 196, line 13 has been amended as follows: --possible number of 1-bound signals to the 1-output group. For a 2b-to-b concentrator ~~is~~--.

Page 196, line 17 has been amended as follows: --concentrator ~~is~~ composed of interconnected routing cells meets this criterion perfectly for--.

Page 197, line 4 has been amended as follows: --banyan-type network. The 2b-to-b concentrator ~~is~~ composed of interconnected routing--.

Page 197, lines 15-16 have been amended as follows: --concentrator ~~is~~ composed of interconnected routing cells can be substituted by a 2b-to-b concentrator ~~is~~ composed of interconnected 0-1 sorting cells. The same applies throughout --.

Page 198, line 10 has been amended as follows: --a 2b-to-b concentrator is composed of interconnected routing cells. The hybrid network--.

Page 198, line 13 has been amended as follows: --of routing cells, and the in-band control signals of a packet changes only between--.

Page 199, line 5 has been amended as follows: --for $1 \le j \le n$,~~; and~~ the in-band control signal to a concentrator in the $j^{th}$ super-stage is $1d_{\gamma(j)}$.--.

Page 201, line 8 has been amended as follows: --A concentrator ~~is~~ composed of interconnected routing cells is a--.

Page 207, line 13 has been amended as follows: --100101, 100111, 101101, and 101111, so this is a ~~2~~3-dimentional rectangle. The number of--.

Page 211, line 2 has been amended as follows: --$p_1 \ldots p_r$ serves as the tiebreaker when the two packets arrived at the same cell are both 0-bound or both 1-bound.--.

Page 213, line 18 has been amended as follows: --super-stage. Note that if $\gamma(p) = \gamma(q)$ in the guide of the network, where $p<q$, the q-th symbol of the routing tag $Q_{\gamma(q)}$ will repeat the p-th symbol $Q_{\gamma(p)}$, when $Q_{\gamma(p)} = Q_{\gamma(q)}$ = 'bicast', the packet may be bicasted at stage-p and then be bicasted again at stage-q such that undesired extra copies of the packet will be produced. Therefore, whenever $\gamma(p) = \gamma(q)$ in the guide of the network, the bicasting function of the whole stage of switching nodes at either stage-p or stage-q should be disabled to prevent such situation. The remaining parts of the control coincide with the above.--.

Page 227, the following lines have been inserted after line 5: --For example, for a $2^6 \times 2^6$ banyan-type network with the guide being 5, 4, 6, 1, 3, 2, if the destination addresses of a multicast packet in this network comprise 001010 (address 1), 011001 (address 2) and 110101 (address 3), for address 1 where $d_1d_2d_3d_4d_5d_6$ = 001010, that is, $d_1$=0, $d_2$=0, $d_3$=1, $d_4$=0, $d_5$=1, and $d_6$=0, then $d_{\gamma(1)}d_{\gamma(2)}d_{\gamma(3)}d_{\gamma(4)}d_{\gamma(5)}d_{\gamma(6)} = d_5d_4d_6d_1d_3d_2$ = 100010 is a guiding sequence of this packet; for address 2 where $d_1d_2d_3d_4d_5d_6$ = 011001, $d_{\gamma(1)}d_{\gamma(2)}d_{\gamma(3)}d_{\gamma(4)}d_{\gamma(5)}d_{\gamma(6)} = d_5d_4d_6d_1d_3d_2$ = 001011 is also a guiding sequence of this

packet; for address 3 where $d_1d_2d_3d_4d_5d_6 = 110101$, $d_5d_4d_6d_1d_3d_2 = 011101$ is another guiding sequence of this packet.--.

Page 227, line 17 has been amended as follows: --associated with longer strings. ~~When two~~ Among symbols ~~are~~ associated with equally long strings,--.

Page 228, lines 3-4 have been amended as follows: --sequence $\gamma(1), \gamma(2), \ldots, \gamma(n)$. By definition, $d_{\gamma(1)}d_{\gamma(2)}\ldots d_{\gamma(n)}$ is a guiding sequence of ~~that~~ a packet when the destination addresses of ~~a~~ that packet include the address $d_1d_2\ldots d_n$. The--.

Page 228, line 13 has been amended as follows: --leading quaternary symbol of one of the two ~~a~~ packets arrived at the bicast cell is 'bicast' and that of the other packet is 'idle', then--.

Page 228, line 17 has been amended as follows: --describes the switching control over a single bicast cell. Meanwhile, in accordance with the present invention, there is also the--.

Page 229, line 7 has been amended to place the filler symbol "□" in between the symbols: --$Q_0 \square Q_{00} \square Q_{01} \square Q_{000} \square Q_{010} \square Q_{001} \square Q_{011} \square Q_{0000} \square \ldots$--.

Page 229, line 11 has been amended to place the filler symbol "□" in between the symbols: --$Q_1 \square Q_{10} \square Q_{11} \square Q_{100} \square Q_{110} \square Q_{101} \square Q_{111} \square Q_{1000} \square \ldots$--.

Page 229, lines 13-14 have been amended as follows: --quaternary symbol starting with the second real symbol in the routing tag, while a packet routed to output-1 of a stage-j cell retains only every other real quaternary symbol starting with the--.

Page 229, lines 15-16 have been amended as follows: --~~second~~ third real symbol in the routing tag. ~~(~~Note that space fillers are not regarded as real quaternary symbols.~~)~~ Again, space fillers replace those non-retained symbols in order to maintain the--.

Page 230, lines 1-4 have been amended to place the filler symbol "□" in between the symbols: --$Q_{00}$□□□$Q_{000}$□□□$Q_{001}$□□□$Q_{0000}$□□□…

$Q_{01}$□□□$Q_{010}$□□□$Q_{011}$□□□$Q_{0100}$□□□…

$Q_{10}$□□□$Q_{100}$□□□$Q_{101}$□□□$Q_{1000}$□□□…

$Q_{11}$□□□$Q_{110}$□□□$Q_{111}$□□□$Q_{1100}$□□□…

Page 230, line 13 has been amended as follows: --101, and 111, of an 8×8 banyan network **(7600)**. The coding of the destination addresses--.

Page 230, line 15 has been amended as follows: --follows. The quaternary symbols '0-bound', '1-bound', 'idle', and ~~bi-cast~~ 'bicast' are abbreviated as 0,--.

Page 231, line 1 has been amended as follows: --the first packet are 000 and 011, and ~~that~~ those for the second packet are 010, 100, 101, and 111.--.

Page 231, line 2 has been amended as follows: --For the first packet, the first symbol Q_ =in the routing tag is 0 because, according to the rules of the--.

Page 231, line 5 has been amended as follows: --but S1 = "1" is not a prefix of any guiding sequences of the first packet, the condition for the case $Q_S$ =--.

Page 231, line 12 has been amended as follows: --its leading symbol is "0" and the other input of the cell is idle, the cell sets its connection--.

Page 232, lines 1-2 have been amended as follows: --the output-0 retains every other real quaternary symbol starting with the second real symbol ~~which is "0"~~ in the routing tag "B□0□1□" **(7612)**, "0", and thus gives the new routing tag "0□□□" **(7613)**, while the copy of the packet at the output-1 retains every other real quaternary symbol starting with the third real symbol ~~which is "1"~~ in the routing tag "B□0□1□" **(7612)**, "1", and thus gives the new routing tag "1□□□"--.

Page 233, line 1 has been amended as follows: --Section F) associated with the n-leaf rightist tree. Take the ~~final~~ first recursive step in such a--.

Page 234, line 9 has been amended as follows: --converted into a ~~the~~ construction of a self-routing switch that is "nonblocking in the--.

Page 234, line 17 has been amended as follows: --multicast mechanism toward an arbitrary set of output addresses as described in the sub-section J1 is ported--.

Page 238, line 15 has been amended as follows: --The intuitive design of the switching element in the existing art usually has all the $\log_2 m$ bits--.

Page 239, lines 5-9 have been amended as follows: --and output ports. ~~Assume that the switching element needs $R_j$ bits from each of the two input packets in order to determine the $j^{th}$ output bit at both of the output ports. Then, the local buffering delay is $max_j\{R_j-j\}$. Because of the local switching delay, the total local delay incurred at the 2×2 switching element may turn out to be, for example, $max_j\{R_j-j\}+1$.~~--.

Page 239, the following lines have been inserted before line 15: --Assume that the switching element needs $R_j$ bits from each of the two input packets in order to determine the $j^{th}$ output bit at both of the output ports. Then, the local buffering delay is $max_j\{R_j-j\}$. Because of the local switching delay, the total local delay incurred at the 2×2 switching element may turn out to be, for example, $max_j\{R_j-j\}+\varepsilon$, where $0<\varepsilon\leq 1$. --.

Page 240, line 11 has been amended as follows: --When the two input packets to the bicast cell are a bicast ~~cell~~ packet and an idle--.

Page 242, line 11 has been amended as follows: --Therefore, $R_1 = 2$ and hence the local buffering delay $max_j\{R_j-j\} \geq R_1-1 = 1$ ~~is nonzero~~ under such--.

Page 244, line 16 has been amended to remove the underline in the sentence: --The method <u>to achieve local buffering delay in the bicast cell</u> is described case by case.--.

Page 247, lines 4-5 have been amended as follows: --FIG. 80 shows the case for $I_1$ = 10, which is symmetric to Case 1. $O_1$ = ~~10~~01 again in this case. It will be shown that $O_1$ = ~~10~~01 is also always correct no matter which of the four--.

Page 249, line 5 has been amended as follows: --connection states. In some implementations, all of the remaining bits may be used as the--.

Page 249, line 7 has been amended as follows: --Case 3.3: $I_2$ = ~~01~~10 **(81300)**--.

Page 249, lines 8-9 have been amended as follows: --The input packets at input-0 and input-1 are respectively '~~idle~~0-bound' and '~~0-bound~~idle'. Therefore, the connection state is set to ~~cross-~~bar and latched **(81301)**, and $O_2$ = 10.--.

Page 249, line 10 has been amended as follows: --Case 3.4: $I_2$ = ~~10~~01 **(81400)**--.

Page 249, lines 11-12 have been amended as follows: --The input packets at input-0 and input-1 are respectively '~~0-bound~~idle' and '~~idle~~0-bound'. Therefore, the connection state is set to ~~bar-~~cross and latched **(81401)**, and $O_2$ = 10.--.

Page 250, line 9 has been amended as follows: --Case 4.3: $I_2$ = ~~01~~10 **(82300)**--.

Page 250, line 11 has been amended as follows: --Therefore, the connection state is set to cross and latched **(82301)**, and $O_2$ = ~~10~~ 01.--.

Page 250, line 12 has been amended as follows: --Case 4.4: $I_2$ = ~~10~~01 **(82400)**--.

Page 250, line 14 has been amended as follows: --Therefore, the connection state is set to bar and latched **(82401)**, and $O_2$ = ~~10~~ 01.--.

Page 250, line 18 has been amended as follows: --coding scheme given in Table 2. The four entries, "00", "01", "~~10~~11" and "~~11~~10" in the right--.

Page 251, line 14 has been amended as follows: --approximately the same proportion. When comparing the two examples elucidated above, which respectively adopting an arbitrary coding scheme with deficiency and the new coding scheme in accordance with the present invention, the difference between 1 and 0 in the local buffering delay per 2×2 switching element accumulates in a network composed of many stages of 2×2 switching elements.--.